2.0 ALTERNATIVES

NMFS published an advance notice of proposed rulemaking (ANPR) (NMFS, 2003a) proposing three options to estimate the T_{ins} for marine mammal stocks. T_{ins} essentially designates the maximum value that is considered an insignificant level of mortality and serious injury approaching a zero rate. The three options are the premises of the action alternatives addressed in this EA. The action alternatives (Alternatives 2, 3, and 4) define ZMRG in terms of T_{ins}.

In addition to the three action alternatives, this EA also analyzes the No Action Alternative according to CEQ's NEPA regulation guidelines. NMFS received suggestions for additional alternatives in comments on the ANPR (see Appendix A) and considered these additional alternatives but dismissed them from further analysis as discussed in section 2.3.

2.1 Alternative 1: No Action Alternative

The No Action Alternative would maintain status quo, thus not presenting any regulatory definition of ZMRG. As discussed in Chapter 1, although there is no regulatory definition of ZMRG, NMFS has been using the criterion of ten percent of a stock's PBR in SARs to evaluate whether incidental mortality and serious injury is at insignificant levels approaching a zero rate (see Table 2-1). NMFS will continue using this criterion in SARs until a final rule is completed defining ZMRG. However, ZMRG would continue to have no regulatory definition; thus, it would be unclear how ZMRG applies in the implementation of MMPA Section 118.

Table 2-1 delineates the four alternatives by showing how T_{ins} is calculated and how it relates to the PBR equation. Also, the last column in the table shows the amount of recovery delay under each alternative; the delay in recovery is determined using the assumption that all other factors contributing to a delay in the recovery of a stock are negligible. Other such factors may include natural events or other anthropogenic activities unrelated to commercial fishing operations. Therefore, the recovery delay in the table refers only to delays caused by incidental mortality and serious injury caused by commercial fisheries.

Table 2-1
Definitions of Insignificance Threshold (T_{ins})

	Calculation	Relative to PBR	Recovery Delay**
Alternative 1: No Action Alternative*	$T_{ins} = 0.1 (N_{min} * 0.5R_{max} * F_r)$	All stocks: 10% PBR	Healthy stocks: ≤ 10% Stocks of threatened, depleted, or unknown status: ≤ 5% Endangered stocks: ≤ 1%
Alternative 2: Preferred Alternative*	$T_{ins} = 0.1 (N_{min} * 0.5R_{max} * F_r)$	All stocks: 10% PBR	Healthy stocks: ≤ 10% Stocks of threatened, depleted, or unknown status: ≤ 5% Endangered stocks: ≤ 1%
Alternative 3	Cetaceans: $T_{ins} = 0.002 * N_{min}$ Pinnipeds: $T_{ins} = 0.006 * N_{min}$	Healthy stocks: 10% PBR Stocks of threatened, depleted, or unknown status: 50% PBR Endangered stocks: 100% PBR	All stocks: ≤ 10%
Alternative 4	Cetaceans: $T_{ins} = 0.001 * N_{min}$ Pinnipeds: $T_{ins} = 0.003 * N_{min}$	Healthy stocks: 5% PBR Stocks of threatened, depleted, or unknown status: 10% PBR Endangered stocks: 50% PBR	All stocks: ≤ 5%

* Alternatives 1 and 2 differ only with respect to regulatory power—ZMRG would remain undefined under Alternative 1 and would, therefore, lack clear application in a regulatory manner.
** This column refers to the recovery of a stock excluding all factors other than commercial fishing operations. Natural events or other anthropogenic factors could also contribute to delay in recovery.

The No Action Alternative is not a feasible option because it would impede the ability of NMFS to apply the MMPA as provided in sections 1.1 and 1.6 of this EA, and it would not be consistent with the settlement agreement described in these sections. The No Action Alternative would not result in any regulatory definition of ZMRG. Although the No Action Alternative would not be consistent with the statement of purpose and need for this action, this alternative will be analyzed throughout the EA in order to provide a baseline to which the potential impacts of the various alternatives can be compared.

2.2 Action Alternatives

The action alternatives differ only in the way T_{ins} is calculated. The requirement remains the same—each action alternative defines ZMRG as the requirement for commercial fisheries to reduce incidental mortality and serious injury of marine mammals to levels equal to or below T_{ins}, as calculated on a stock-specific basis for marine mammals with incidental interactions with the commercial fishery under analysis. Because T_{ins} is calculated differently under each action alternative, there are differences in the number and types of fisheries resulting in marine mammal incidental mortality and serious injury greater than the T_{ins} under each alternative.

Additionally, all three action alternatives define "approaching zero" as infinitely nearing zero, not equal to zero. That is, "approaching zero" means getting as close as possible to zero. This does not mean that the target level, T_{ins}, is a moving target. Instead, T_{ins} equals the target level that was calculated to be as close to zero as possible for a particular stock.

"Rate" would be defined as the number of animals that die or are seriously injured each year per 1,000 animals in that population. Because such a rate takes into account a specific stock's status as opposed to the status of the species as a whole, it best describes incidental mortality and serious injury of a marine mammal stock regarding productivity and biological significance (see section 1.3). Also, using units of animals per year facilitates coordination of calculations of T_{ins} with the LOF. NMFS updates the LOF annually based on any new information on each fishery's level of incidental mortality and serious injury compared to the PBR of each stock with which each fishery interacts; other factors can also be involved in the process of updating the LOF.

ZMRG applies to all marine mammal stocks and all commercial fisheries. Based on the 1995 and 2004 proposed rules (NMFS, 1995b & 2004f), each action alternative follows a two-tiered approach toward achieving ZMRG for each stock. ZMRG could be achieved by meeting either of the two criteria. According to the first criterion, incidental mortality and serious injury of one marine mammal stock would have to be insignificant (equal to or less than T_{ins}) for all fisheries combined. The second criterion applies only to cases in which all fisheries collectively exceed T_{ins} for a particular stock but individually do not exceed T_{ins} for that stock. The second criterion of the two-tiered approach would require each individual fishery to incur a level of incidental mortality and serious injury that is no more than ten percent of T_{ins}. This is based on the theory that some fisheries would be responsible for most of the incidental mortality and serious injury while others would be responsible for insignificant amounts, that is, ten percent or less of the T_{ins} for that stock (Barlow, et al., 1995). Each action alternative described in this EA follows this two-tiered approach in determining whether ZMRG has been attained.

The T_{ins} calculation is based on the PBR calculation and, therefore, is subject to similar limitations and assumptions. The logistic model that is the basis for T_{ins} and PBR calculations may present assumptions that are not valid for all stocks, such as some declining or very small stocks (Wade and Angliss, 1997; NMFS, 2004f). The model assumes that populations would grow if human-caused mortality is below sustainable levels. This assumption is false for some stocks, such as Hawaiian monk seals, that experience declining populations without known incidental mortality and serious injury levels high enough to cause the decline. Therefore, under each alternative, the calculation of T_{ins} may not be applicable to every marine mammal stock. In such cases, NMFS may have to do additional calculations or use a subjective adjustment to determine the T_{ins}. For the purposes of this EA, default values will be used for $0.5R_{max}$ and F_r (see section 1.4.1 for a description).

2.2.1 Alternative 2: Preferred Alternative

NMFS has identified Alternative 2 as the preferred alternative for the proposed action. Alternative 2 differs from the No Action Alternative only in that the ZMRG would have a regulatory definition and, therefore, have clear application in a regulatory manner. Alternative 2 defines T_{ins} as ten percent of the stock's PBR (see Table 2-1).

Alternative 2 would use varying recovery factors, and thus have different recovery delays, for stocks depending on their status (see Table 2-1). For the purposes of this EA, calculating recovery delay is based only on interactions with commercial fishing operations and does not include other factors such as natural events and other anthropogenic factors unrelated to commercial fisheries. For healthy stocks, there would be no more than a ten percent delay in recovery. For stocks of a threatened, depleted, or unknown status, there would be no more than a five percent delay in recovery. For endangered stocks, there would be no more than a one percent delay in recovery.

2.2.2 Alternative 3

Alternative 3 defines T_{ins} as the value that would not cause more than a ten percent delay in recovery of the marine mammal stock. Under Alternative 3, T_{ins} would be calculated differently for cetaceans and pinnipeds. Also, manatees and polar bears would be treated as cetaceans for the purposes of calculating T_{ins} under Alternative 3, and sea otters (excluding the California sea otter as provided in Section 118(a)(4) of the MMPA) would be treated as pinnipeds for the purposes of calculating T_{ins} under Alternative 3. This determination is based on similarity of life history characteristics and R_{max} values—manatees and polar bears are biologically similar to cetaceans while sea otters are biologically similar to pinnipeds (Barlow, et al., 1995). Under Alternative 3, T_{ins} for cetaceans would be 0.2 percent of N_{min}, and T_{ins} for pinnipeds would be 0.6 percent of N_{min} (see Table 2-1).

For endangered stocks, T_{ins} would be equal to PBR under Alternative 3. This is inconsistent with MMPA Section 118(f)(2), which provides that each TRP shall have a long-term goal (reaching ZMRG) separate from its short-term goal (reducing incidental mortality and serious injury to levels less than PBR). Therefore, Alternative 3 is not a feasible option for implementing the proposed action. However, analysis of Alternative 3 will be continued throughout this EA for purposes of comparison to the other alternatives.

2.2.3 Alternative 4

Alternative 4 defines T_{ins} as 0.1 percent of N_{min} for cetaceans or 0.3 percent of N_{min} for pinnipeds. This definition results in a T_{ins} value that would not cause more than a five percent delay in recovery of the marine mammal stock. Also, manatees and polar bears would be treated as cetaceans for the purposes of calculating T_{ins} under Alternative 4, and

sea otters (excluding the California sea otter as provided in Section 118(a)(4) of the MMPA) would be treated as pinnipeds for the purposes of calculating T_{ins} under Alternative 4. This determination is based on similarity of life history characteristics and R_{max} values—manatees and polar bears are biologically similar to cetaceans while sea otters are biologically similar to pinnipeds (Barlow, et al., 1995). Under Alternative 4, T_{ins} for cetaceans would be 0.1 percent of N_{min}, and T_{ins} for pinnipeds would be 0.3 percent of N_{min} (see Table 2-1).

2.3 Alternatives Considered but Dismissed from Further Analysis

Based on the 14 comment letters received in response to the ANPR (see Appendix A), five other alternatives were suggested. However, for various reasons, as stated below, the suggested alternatives have been dismissed from further analysis in this EA.

2.3.1 Alternative 5

Alternative 5 calls for the use of PBR and a technology standard to define ZMRG for stocks that are not endangered, threatened, or depleted. For endangered, threatened, or depleted stocks, Alternative 5 suggests using a more restrictive standard in addition to the PBR calculation to hasten the achievement of ZMRG for such stocks.

The MMPA and its legislative history are clear that a technology standard cannot define ZMRG because the ZMRG should be based on biological significance as discussed in section 1.3. The PBR and ZMRG should be calculated based on the biological significance of incidental mortality and serious injury to a marine mammal stock, not on a standard created to describe the effect of technology on the stock. For this reason, this EA does not further consider Alternative 5.

2.3.2 Alternative 6

Alternative 6 suggests a modification of the ANPR's Option 1 (the model for Alternative 2 in this EA). The modification consists of a second component that requires further reductions in mortality and serious injury for stocks with high PBR values. The comment did not include details on the calculation of the second component.

Alternative 6 is very similar to Alternative 4 in that the calculation of T_{ins} allows for further reductions in mortality and serious injury for stocks with high PBRs. For example, consider healthy stocks, which have high PBRs and a default F_r of 1.0. Under Alternative 6, a healthy stock would have a T_{ins} less than the T_{ins} calculated for Alternative 2 (Option 1 from the ANPR) when including the second component. Under

Alternative 4, a healthy stock would have a T_{ins} equal to half the value of T_{ins} calculated for Alternative 2.

For healthy stocks,

Alternative 2: $T_{ins} = 0.1 (N_{min} * 0.5R_{max})$
Alternative 4: $T_{ins} = 0.05 (N_{min} * 0.5R_{max})$
Alternative 6: $T_{ins} = 0.1 (N_{min} * 0.5R_{max}) * x$,
where x is the second component.

The comment proposing Alternative 6 did not include specific suggestions for the second component. As demonstrated above, Alternative 4 could produce a similar value for T_{ins} when compared to Alternative 6. For example, if x equals 0.5, Alternatives 4 and 6 would be identical. Because it is not possible to clearly distinguish Alternative 6 from Alternative 4 for stocks with high PBRs, Alternative 6 is not considered further in this EA.

2.3.3 Alternative 7

Alternative 7 consists of six major components:

- ZMRG would be equivalent to PBR.
- ZMRG would not apply to
  - robust stocks.
  - severely endangered stocks (i.e., PBR ≤ 5).
  - stocks that are not under a MMPA management program.
- The Secretary would prioritize the application of the ZMRG for stocks with
  - small populations.
  - rapidly declining populations.
  - a level of incidental mortality and serious injury that has not dropped significantly within five years of TRP implementation.
- ZMRG definition must incorporate available technology and economic feasibility.
- The Secretary, in coordination with the TRT and the SRG, would review and determine the availability of technology and economic feasibility.
- If technology is deemed unavailable and a fishery is not achieving the ZMRG after five years under an approved TRP, the Secretary would work with fishery participants to develop and implement the appropriate technology.

NMFS currently prioritizes the development and implementation of TRPs for stocks with small populations, declining populations, or incidental mortality and serious injury exceeding that stock's PBR.

Elements of Alternative 7 are inconsistent with the MMPA, and therefore, this alternative is not considered further in this EA. Specifically, the MMPA mandates the application of the ZMRG to all commercial fisheries; this includes fisheries that interact with any marine mammal stock, regardless of its status. In addition, as discussed in section 2.2.2, MMPA Section 118(f)(2) provides that reducing incidental mortality and serious injury to levels less than PBR is a separate goal from reaching ZMRG; thus, ZMRG cannot be equivalent to PBR.

2.3.4 Alternative 8

Alternative 8 outlines a three-part approach to defining ZMRG. First, NMFS would adopt as the final rule the current criterion for determining ZMRG for purposes of SARs as described in Option 1 of the ANPR (the model for Alternative 2 in this EA). Second, if current levels of incidental mortality and serious injury from commercial fishing for a particular marine mammal stock are below the T_{ins} calculated under Alternative 2, the T_{ins} for that stock would be set no higher than the current level of incidental mortality and serious injury. Such a criterion would satisfy the congressional intent of minimizing incidental mortality and serious injury of marine mammals as much as possible. The third element of this alternative requires NMFS to revisit periodically the T_{ins} for marine mammal stocks in commercial fisheries with a non-zero rate of mortality and serious injury. The T_{ins} for such stocks would be gradually reduced to force technology to play a role in achieving the ZMRG.

Alternative 8 employs a constantly-moving target. The concept of ratcheting down the amount of allowable incidental mortality and serious injury is inconsistent with the MMPA's ZMRG criterion in Section 118(b)(2): fisheries that have achieved the target level are not required to reduce further incidental mortality and serious injury of marine mammals. If the target is continually being lowered, the fishermen would not have a clear, specific goal for reduction of incidental mortality and serious injury, which could create a disincentive for technological innovation designed to protect marine mammals. Such a scheme of racheting down the target precludes the quantification of and clear regulatory definition of ZMRG. Therefore, Alternative 8 is not considered further.

2.3.5 Alternative 9

One comment proposed that the ZMRG would not be achieved until incidental mortality and serious injury equals zero.

This alternative does not take into account that the ZMRG is a level *approaching* a zero rate, not an absolute value of zero. The MMPA provides exceptions to the general

prohibition of taking marine mammals that generally allow some level of incidental mortality and serious injury consistent with the purposes and policies of the Act, thus allowing for continued human activities in the marine environment, including commercial fishing operations. The statutory language of Section 118(b) of the MMPA specifically provides for reduction in levels of incidental mortality and serious injury to insignificant levels *approaching*, not *equal to*, zero. Additionally, Section 118(f) provides that a TRP's long-term goal (achieving ZMRG) should take into account fishery economics, availability of existing technology, and existing FMPs. Since Alternative 9 is inconsistent with the MMPA, it is not considered further in this EA.